

SUMMER 1970

# OUR PUBLIC LANDS

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SPACE-AGE RADIO STATION  
PAGE 5





U.S. DEPARTMENT OF THE INTERIOR  
Walter J. Hickel, Secretary

BUREAU OF LAND MANAGEMENT  
Boyd L. Rasmussen, Director

As the Nation's principal conservation agency, the Department of the Interior has basic responsibilities for water, fish, wildlife, mineral, land, park, and recreational resources. Indian and Territorial affairs are other major concerns of America's "Department of Natural Resources."

The Department works to assure the wisest choice in managing all our resources so each will make its full contribution to a better United States—now and in the future.

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Ed Parker, Editor

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## Contents

# OUR PUBLIC LANDS

SPACE-AGE RADIO STATION	5
By Wayne Gilbert Extending BLM's communications in Alaska	
ONE GOOD TURN TIMES A THOUSAND	7
By Ronald S. Trogstad and Jack M. Reed	
CARBON DIOXIDE AND GLOBAL ECOLOGY	8
By Eugene K. Peterson Changes triggered by man may affect world weather and global ecology	
CROSSROADS OF THE PIONEERS	11
By H. Max Bruce The wagons rolled West through Cassia County	
WILD WELLS	15
By Robert D. Hostetter The battle of Platform C	
MONTANA'S DUCK FACTORIES	18
By Jack D. Jones Modifying stock ponds for waterfowl	
A DAY IN CRACK CANYON	20
By John D. Carlson A walk to remember	
PUBLIC SALE BULLETIN BOARD	22



The Cover  
BLM's space-age radio station in Alaska. Mt. McKinley in background. Photo by Bob Olendorff.



# HIGHLIGHTS

## Public Land Law Review Commission Completes Study

The Public Land Law Review Commission, established by Congress in 1964 to study the Nation's land laws, has completed its assignment. The Commission's report was scheduled to be delivered to Congress in June.

Three previous studies of the Nation's land policies have been made. The present Commission, however, is the first to review all the public land laws and resources at one time and also to be specifically required to review Alaska's lands and resources, the Outer Continental Shelf, and the mineral interest of the United States in lands transferred to other ownerships.

Guiding the work of the Commission since 1964 have been its Chairman, Representative Wayne N. Aspinall of Colorado, and its Director, Milton A. Pearl.

The Commission's "Land Law Report," carried as a regular feature of "Our Public Lands" since 1966, has been discontinued.

## New Forest Management Plan Based On Environmental Considerations

A new forest management plan that will give added consideration to environmental protection has been proposed by Secretary of the Interior Walter J. Hickel for BLM-managed lands in western Oregon.

The 2.4 million acres of BLM lands in western Oregon are among the most productive in the United States, presently producing timber valued at more than \$80 million annually. They have been managed for multiple use and sustained yield since 1937.

"I feel strongly that the time has come to completely recognize the environmental aspects of timber harvesting on these lands," Secretary Hickel said. "While we are obligated to a course of sustained yield timber management, we also have obligations to other forest uses and to the environment. I am convinced that some of these forest lands now have higher value for recreation areas and scenic beauty, and for streamside corridors that serve these needs and also protect soils and water quality."

## 1969 Biggest Year for "The Last Frontier"

BLM's 16-mm. sound and color motion picture, "The Last Frontier," had its biggest year in 1969 when more than 6 million people saw it. The film's commercial distributor, Sterling Movies, U.S.A., Inc., estimates 6,031,534 viewers saw the film on 154 telecasts. A total of 277,000 people attended nearly 5,000 individual showings. More than 12 million people have seen the film since its release in mid-1967.

## Holiday Magazine Honors BLM Director

Boyd L. Rasmussen, Director of the Bureau of Land Management, has received one of 12 Holiday Awards for a Beautiful America given by Holiday Magazine for 1970.

The magazine cited Mr. Rasmussen "for Government leadership and inspiration to an agency which has responsibility for four-hundred-fifty million acres of public land in the West and Alaska. This land has immense potential for diverse recreational opportunities. Mr. Rasmussen has worked to correct years of abuse and neglect of our public lands."

Holiday's announcement said that the awards are given in recognition of individuals and groups in the United States actively devoted to the cause of conservation of our environment, and as an incentive for further efforts by all Americans.

## BLM To Employ Weather Modification in Fighting Forest Fires in Alaska

Rain, induced by the seeding of clouds with silver iodide, will be one weapon used by the Bureau of Land Management in its efforts to control wildfires in Alaska during the 1970 fire season.

This will be the first time any Interior agency has employed weather modification to fight forest fires on an operational basis. The method is being adopted to help the Bureau cope with what is expected to be one of the severest fire seasons in Alaska in recent years. Snow and rainfall were exceptionally light this winter.

Last year more than 500 wildfires burned nearly 4.5 million acres of the State. During the fire season a cloud seeding operation was used on a limited basis.



**Portion of the Rio Grande  
Dedicated As Nation's  
First Wild River**



Travelers from the East, Donny and Majorie Lee, enjoy a view of the Rio Grande Gorge. Readers may recognize this scene as the cover illustration of the first edition of BLM's popular recreation guide to the public lands, "Room to Roam."

A spectacular stretch of the Rio Grande in northern New Mexico was formally dedicated in May as the first component of the National Wild and Scenic River System.

The portion dedicated is a 48-mile stretch of wild river that runs from the Colorado-New Mexico border through the narrow, basalt-rimmed Rio Grande Gorge. The gorge varies from 300 to 800 feet deep and from 1,300 to 4,000 feet across. The high, steep walls of the river have spared it from excessive human development.

Also included in this first unit of the national system are the lower 4 miles of the Red River, a tributary of the Rio Grande.

Dedication ceremonies, conducted by W. J. Anderson, BLM State Director for New Mexico, were held at the gorge near Questa, N. Mex. BLM Director Boyd L. Rasmussen dedicated the Rio Grande and unveiled a bronze plaque commemorating the event. William D. Hurst, Regional Forester for the Southwest, U.S. Forest Service, and Melvin Helander, Assistant Pueblo Area

Director for Economic Development, Bureau of Indian Affairs, assisted in the unveiling.

Other participants included David F. Cargo, Governor of New Mexico; Ladd S. Gordon, Director of the New Mexico Department of Fish and Game; and Jim Peeler, editor of the Taos News.

Entertainers Burl Ives, Randy Sparks, and Karen Rondell made guest appearances on behalf of the Johnny Horizon antilitter program. Television and screen actor Ricardo Montalban spoke briefly in appreciation of efforts to protect wild and scenic environments.

Director Rasmussen said that of all the Rio Grande's 1,900 miles, "this 48-mile wild river stretch is the least civilized, least polluted, and least accessible."

And he said of the rivers: "We hold this ceremony to honor foresight that sees beyond the progress of a mere generation and rests upon a simple truth. There are places such as these that must be loved and guarded because—for them—there is no higher use."



# SPACE-AGE RADIO STATION

## *Extending BLM's communications in Alaska*

**I**T WASN'T an ideal time or place for men to work. It was mid-March and  $-25$  degrees, and the men were at 14,000 feet where the air is thin.

But the BLM crew in Alaska got the job done: the installation of a remotely controlled radio repeater station on top of one of Mt. McKinley's lesser peaks.

The station, which will enable BLM dispatchers in Anchorage to talk to aircraft over half of Alaska, is right out of the space age and the only one of its kind on earth. Using solar cells like those in space satellites, the repeater station will depend solely upon the sun for its primary source of power.

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By WAYNE GILBERT

Chief, Branch of Communications  
BLM State Office, Anchorage, Alaska

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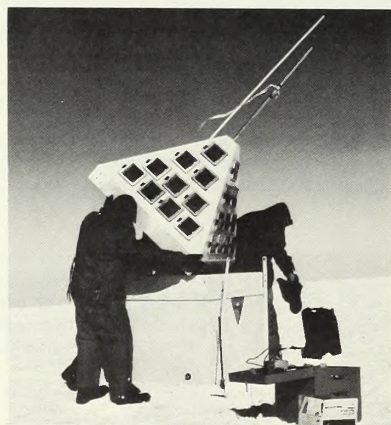
With the station in place, checked out and operating, the BLM crew takes a breather before packing up to leave the mountain. L to r; Joe Townsend, John Senn, Mike Terry, Wayne Gilbert, and Roger Wirsch.







Unloading the station base.



Side straps were bolted to the upper section to hold it down.



Placing the station base over the rods.

At 14,000 feet, the station is also believed to be the world's highest; in any event, it can only be reached by supercharger-equipped helicopters or expert mountain climbers.

The compact and highly insulated station was designed and developed by my staff and me to meet Alaska's extreme weather conditions and the Bureau's special requirements. Because of its remote site on a mountain peak perpetually frozen in snow and ice, the unit's equipment has a 5-year lifespan and is designed to operate 3 years without maintenance.

This unique radio station is the first of a number of similar stations to be installed in the Wrangell Mountains and the Alaska Range. Where they are installed at lower elevations and accessible by most helicopters, their primary power source during summer may be thermo-electric generators using propane gas. Aircraft-type, wind-driven generators could be used during the winter months.

A net of as many as five of these mountaintop repeaters would give the Anchorage dispatcher direct contact with aircraft owned or chartered by the Bureau through most of Alaska. Aircraft on the ground, when in sight of any mountain bearing a repeater, would be able to talk directly with the dispatcher. This would reduce the costly dead time that otherwise would be spent waiting for communications to be relayed back and forth through a number of stations. □



**W**HAT do you do with 10,000 bitterbrush seedlings to plant? You get some help—like from about a thousand young people.

Out in Skull Valley the Salt Lake District had chained 1,800 acres to remove juniper trees and other undesirable plants. Called the Salt Mountain project, development work included seeding a variety of grass, forb and browse species, 3½ miles of fencing and a 10-acre-foot reservoir.

The area is critical deer winter range with a history of heavy use by deer and livestock. Invading juniper had replaced most of the desirable forage species. Project objectives are to improve the wildlife habitat, increase livestock forage, and improve watershed values.

The Forest Service's Lucky Peak Nursery near Boise, Idaho, furnished 10,000 seedlings for the project. But getting that many seedlings and getting them planted are two different problems.

The Utah State Division of Fish and Game, the Salt Lake County Fish and Game Association, the Tooele County Wildlife Federation, and other outdoor groups were interested in helping.

Conservation projects for Scout merit badge work and advancement programs sometimes are scarce in

urban areas. This project, 65 miles from Salt Lake City, provided an opportunity readily recognized by youth leaders. On the day of the planting, some 1,000 boys and girls and their leaders showed up with shovels and hoes. They came from four counties, and many came the night before to add camping to the conservation experience.

After being told how to select a suitable site, dig the hole, spread the roots and cover with moist earth, and finally prune the top growth, the thousand volunteers took to the hills. Leaders were given a few seedlings each, and the monumental task was soon done. Leaders then got 80 pounds of four-wing saltbush seed to plant.

With seedlings and seeds planted, the conservation army returned to camp and consumed 90 gallons of hot chocolate, compliments of the wildlife organizations.

Before they left, everyone pitched in to cleanup trash and debris. More than 5 cubic yards of trash were removed, most of which had been left by other users.

Cyril L. Jensen, BLM Salt Lake district manager, said the seedlings will be watched closely and results evaluated for use in designing similar future developments.

And all who participated now have a keen interest in the Salt Mountain area and in resource conservation. Many were overheard to say that they want to go back someday and see "their" bitterbrush plants. □

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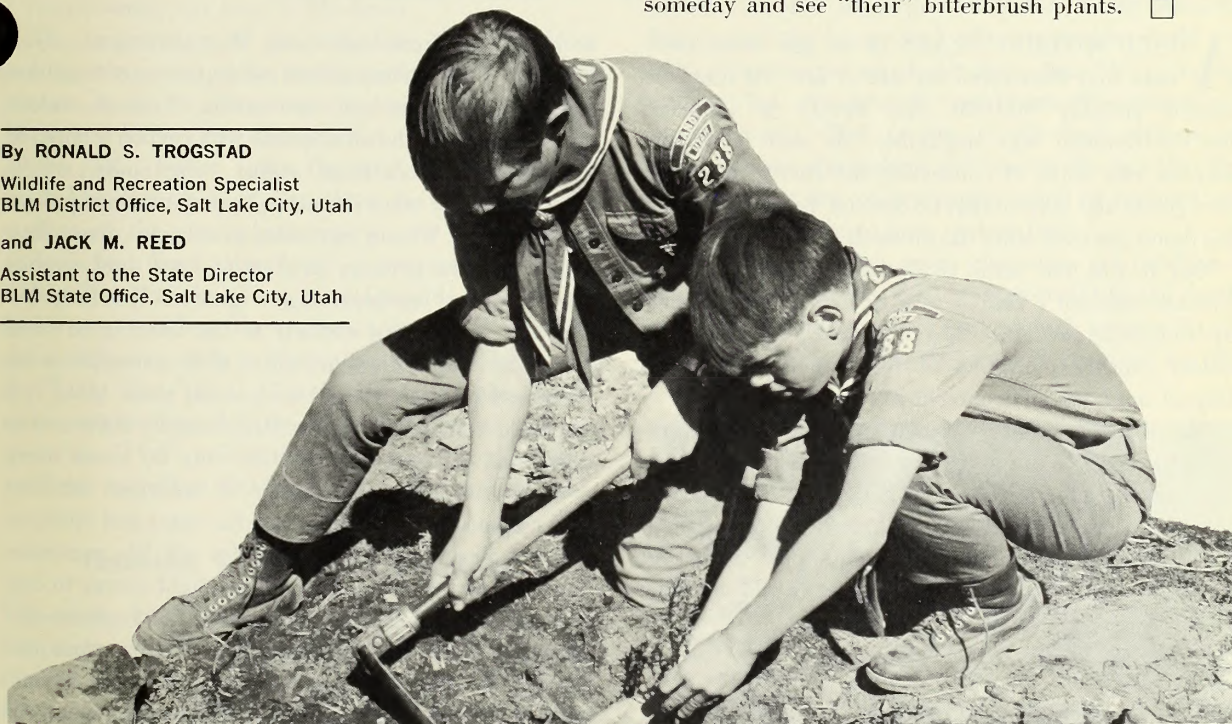
By **RONALD S. TROGSTAD**

Wildlife and Recreation Specialist  
BLM District Office, Salt Lake City, Utah

and **JACK M. REED**

Assistant to the State Director  
BLM State Office, Salt Lake City, Utah

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# One Good Turn Times a Thousand



# CARBON DIOXIDE AND GLOBAL ECOLOGY



"... destructive of esthetic values and pollution of the atmosphere . . ." Bureau of Reclamation Photo.

**A** HALF MILLION YEARS or so ago when early man first discovered the use of fire, his numbers totaled possibly 500,000. His ability to influence his environment was negligible. As man gradually learned new ways of converting the energy from fire into goods and service that he desired, he also extended his dominion over other life on earth.

But it was not until 1830 that the population of humans reached 1 billion. And it has been only since the industrial revolution began in 1860, with the coincident rapid exploitation of fossil fuels, that man's impact upon his environment has skyrocketed.

The world population is now 3½ billion. It is projected to reach 7 billion by the year 2000. The average per capita production of goods and services is expected to treble during the same period. This will require energy of heretofore undreamed magnitude, about six times present levels. Most of that energy will continue

to be derived from fossil fuels. Most persons are aware of some of the environmental consequences of fossil fuel combustion: waste heat, destruction of esthetic values, and pollution of the atmosphere with carbon monoxide, unburned hydrocarbons, sulfur compounds, smoke, dust, and many other irritating, malodorous and poisonous products. We are beginning to move to correct these problems. The primary product of fossil fuel combustion, however, has been largely ignored. This is carbon dioxide. Due almost entirely to the burning of fossil fuels, the carbon dioxide content of the atmosphere has increased between 10 and 15 percent since 1860. It is expected to increase another 30 percent by 2000, and an additional 30 percent by 2020, only 50 years away.

Carbon dioxide, like oxygen, is colorless, odorless, and nonpoisonous. Both gases, plus water and nitrogen, are the basic building blocks for all life processes. Through photosynthesis, plants use light energy to convert carbon dioxide and water into carbohydrates and release oxygen into the atmosphere. When plant materials decompose, or burn, or are consumed by animals, the process is reversed. Oxygen is used to convert carbohydrates into energy plus carbon dioxide and water. These are the basic steps in the complex carbon cycle.

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By **EUGENE K. PETERSON**

Chief, Division of Basin Studies  
BLM Service Center, Portland, Oreg.

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# **Changes triggered by man may affect world weather and global ecology**

## **The Greenhouse Effect**

Carbon dioxide in the atmosphere also creates a greenhouse effect. It admits the visible rays from the sun but after these rays are converted to heat rays on the earth's surface, it prevents some of the latter rays from escaping into space. The earth's atmosphere consists of 78 percent nitrogen, 21 percent oxygen, and only 0.032 percent carbon dioxide (1/650th the amount of oxygen). However, the carbon dioxide plus very small quantities of water vapor and ozone are largely responsible for temperatures that now exist on earth. Without these rare gases the earth's temperature would be comparable to that on the moon. An excellent example of the greenhouse effect is the planet Venus. It has a heavy atmosphere consisting of about 93 percent carbon dioxide and 7 percent nitrogen. Due to the carbon dioxide atmosphere, its surface temperature is over 700° F. on both the daylight side and the nightside. (Venus rotates only once in 243 days).

The temperature of the earth has changed—from periods when most of the earth's surface had a tropical climate, to severe glacial epochs—many times during its several billion year history. For at least nine-tenths of the past 1 billion years, the earth was warmer and more humid than it is today. Also, the carbon dioxide content of the atmosphere was greater. These warm periods have been interrupted at intervals of roughly 250 million years by severe glacial periods of a few million years duration. Today, the earth is in a warming trend following such a glacial epoch, the Pleistocene. In "Early Man," E. C. Howell reports that the annual mean temperature of Paris about 20,000 years ago was probably 11° F. colder than it is now. At that time, sea level was about 400 feet less than the present level.

## **Potential Temperature Increases**

Between 1885 and 1940 average global surface temperatures increased nearly 1° F. If the carbon dioxide content of the atmosphere increases 60 percent within the next 50 years, American scientists predict an accompanying minimum increase in worldwide mean temperatures of 3° F. The effect of such an increase in the United States would be comparable to

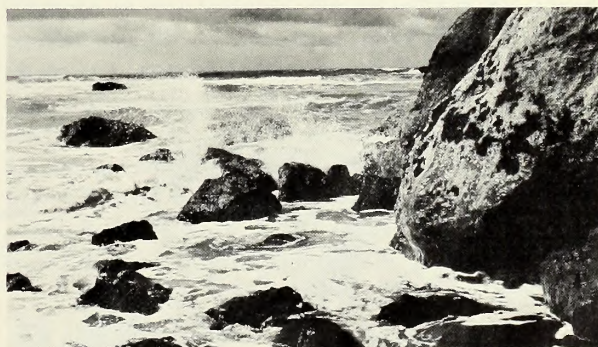
moving everyone south from 1° to 4° in latitude. The icecaps would start to melt enough to add about 2 feet in 10 years to sea level. A 60 percent increase in atmospheric carbon dioxide would also cause plants to grow about 10 percent faster since present levels are much below the optimum for plants. Enriching greenhouse atmospheres with carbon dioxide can increase the growth of most plants over 100 percent and improve their vigor and resistance to insects and diseases.

If we should burn all the known reserves of coal, oil, gas, etc., the carbon dioxide content of the atmosphere would increase about 2.8 times, or from the present 325 parts per million to 925 (assuming 50 percent of the gas continues to be absorbed by the oceans). This would be sufficient to increase world temperatures 9° F. or more and create a tropical or subtropical climate in much of the United States. It would also cause vast ecological changes on the entire globe.

## **Effect on Oxygen-Carbon Dioxide Ratio**

At present and projected future rates of consumption, the present known fossil fuel reserves could be exhausted by the year 2050, only 80 years away. Fortunately, the burning of these fossil fuels would reduce atmospheric oxygen less than 0.6 percent or from the present 209,490 parts per million to about 208,290. Burning all the forests and other vegetation would not reduce the oxygen supply by more than 150 parts per million (but, of course, it would have other disastrous consequences). This is due to the vast reserves of oxygen in the atmosphere and also to the fact that the only way that the oxygen supply could be reduced appreciably would be to burn carbon fuels.

A tree or any other green plant does not produce a net increase in oxygen during its normal life and death cycle. Each plant produces only enough oxygen for its own life processes plus the amount required for the



The seas have absorbed three-fourths of the original carbon dioxide. Bureau of Reclamation Photo.



oxidation of the plant remains after death to the original building blocks of carbon dioxide and water, plus heat. In other words, when a plant decays all the oxygen it produced during growth is used; there is no net increase in oxygen.

Additional information about the oxygen-carbon dioxide balance is available from many authoritative sources, including the State University of New York botanist, Eugene Rabinowitch, the German botanist, Helmut Leith, and the Russian plant physiologist, A. A. Nichiporovich.

Carbon dioxide and oxygen percentages in the atmosphere have varied considerably throughout geologic time. In 1965, the Environmental Pollution Panel of the President's Science Advisory Committee concluded that, over the past 4 billion years, at least 40,000 times the quantity of carbon dioxide now present in the air entered the atmosphere from volcanoes. This carbon dioxide was removed from the atmosphere by natural processes over a time scale of millions of years. These natural processes consist of burying organic matter in sediment, and the weathering of rocks on land.

Burial in sediment preserves the plant remains from oxidation and produces a net increase in atmospheric oxygen. One-fourth of the carbon dioxide is locked up in this form, of which a small fraction is concentrated into fossil fuels.

The weathering of rocks on land results in "hard water" which is carried to the sea and eventually precipitates on the floor of the sea mostly as limestone. Three-fourths of the original carbon dioxide is now in the form of limestone and other carbonates. There is no known feasible method of speeding up the natural processes. Consequently, since carbon dioxide from burning fossil fuels is being generated at a vastly greater rate than it is being removed from the air by natural processes, it is accumulating in the atmosphere and the seas. Man preserves some carbohydrates from oxidation for a few decades in the form of wooden buildings, books, etc., but the amounts involved have no appreciable effect on the global oxygen-carbon dioxide balance.

It is evident that most of the oxygen now in the earth's atmosphere displaced the original carbon dioxide as the result of photosynthesis by plants and the burying of organic carbon in sediment during the past 3 billion years that life has existed on earth. In "The Origin of Life on Earth," H. C. Urey, V. A. Sokalov, et al., state that the amount of free oxygen before photosynthesis began was negligible.

### **Volcanoes, Dust, and Smoke**

Particulate matter such as dust and smoke in the atmosphere has a cooling effect on global climate. These

small particles also may cause more cloudiness since they sometimes "seed" storms. Both the particulates and clouds prevent a portion of the sun's rays from reaching the earth. Dust and smoke come from volcanoes and from man's activities, mostly fire. The amount of these particles in the air in recent years apparently has more than offset the warming effect of carbon dioxide since the earth has cooled about 0.5° F. since 1940. However, these particles settle out in about 2 years, unless more are continuously generated, while the carbon dioxide buildup is cumulative. Pumping progressively more pollutants into the air in order to counteract the warming effect of 30 percent more carbon dioxide by 2000 A.D. and another 30 percent by 2020 would be an extremely unpopular and unhealthy remedy.

### **Conclusions**

The carbon cycle probably is the most sensitive of the fundamental systems that control life on earth. Changes in the carbon cycle cause compensating changes in the hydrologic cycle, the nitrogen cycle, and the oxygen cycle. Through rapid exploitation of fossil fuels, mankind is inadvertently triggering major changes in the carbon cycle unprecedented in rapidity in known geologic history.

A full-fledged research program to determine with certainty the many diverse and complex interrelationships that are involved in the buildup of both atmospheric carbon dioxide and particulate matter is essential to mankind's future welfare. The United States, as the leading consumer of fossil fuels, as well as the mineral fuels industry and natural resource oriented foundations should all be major participants.

Also essential is machinery to gain worldwide acceptance of the facts revealed by research and worldwide intergovernmental action to achieve the desired results. Energy sources which would help to preserve the status quo as far as atmospheric carbon dioxide and particulates are concerned are nuclear, tidal, hydro, geothermal, and direct solar energy.

### **Additional Information**

A fuller discussion of this subject may be found in Mr. Peterson's original article under the same title which appeared in the November 1969 issue of *Environmental Science and Technology*, a monthly magazine published by the American Chemical Society. A similar version appeared in the April 1970 issue of *Environment*, an official publication of the Scientists' Institute for Public Information, St. Louis, Mo.



# CROSSROADS OF THE PIONEERS

## *The wagons rolled West through Cassia County*

SOON AFTER moving to southern Idaho 2 years ago, I became interested in early local history. I suppose my interest was first sparked by a U.S. Forest Service report on the Lander Emigrant Trail. This report, prepared in 1966, described the 1857 route through Star Valley, Wyo., up Stump Creek, Lanes Creek, by Gray's Lake, across what is now Blackfoot Reservoir and eventually to Fort Hall, Idaho.

My interest was further whetted by the chance purchase of a very informative book, "Journal of a Trapper, 1834-43," by Osborne Russell. Russell was employed by Nathaniel J. Wyeth in 1834 as a fur trapper, and he helped Wyeth build Fort Hall that year. Wyeth, a Massachusetts ice merchant, had entered the fur trapping business in 1831 but was plagued by bad luck and poor timing. He left the mountains in 1836 and a year later Fort Hall was sold to the British Hudson's Bay Company.

From this beginning, my wife, Sylvia, and I started collecting books, journals, diaries, and anything else

available on the fur trappers in southern Idaho, and on the later routes followed by emigrants to Oregon and California. We soon learned that Cassia County, Idaho, was a crossroads for the majority of overland travelers.

### The Westward Trails

The westward trails split soon after crossing the Continental Divide at South Pass in Wyoming. The Mormon Trail went southwesterly toward Salt Lake City, while the main Oregon Trail, which through Wyoming was the same route used by California emigrants, entered southeastern Idaho and turned northwesterly toward Fort Hall. The Lander Trail, which was established later for its better grass and fuel, bent north of the main Oregon Trail but served essentially the same purpose.

The concept of Cassia County as a "Crossroads of the Pioneers" has become increasingly intriguing to us. The fur trappers learned at an early date to avoid the Great Salt Lake Desert unless they were traveling light and fast. They also learned to avoid crossing the Snake River unless absolutely necessary, and then only at designated places if possible. In fact, they sometimes called the Snake the "Mad River" after the experience of Wilson Price Hunt who led the first white party through Cassia County in 1811 on his way to establish Astoria at the mouth of the Columbia River.

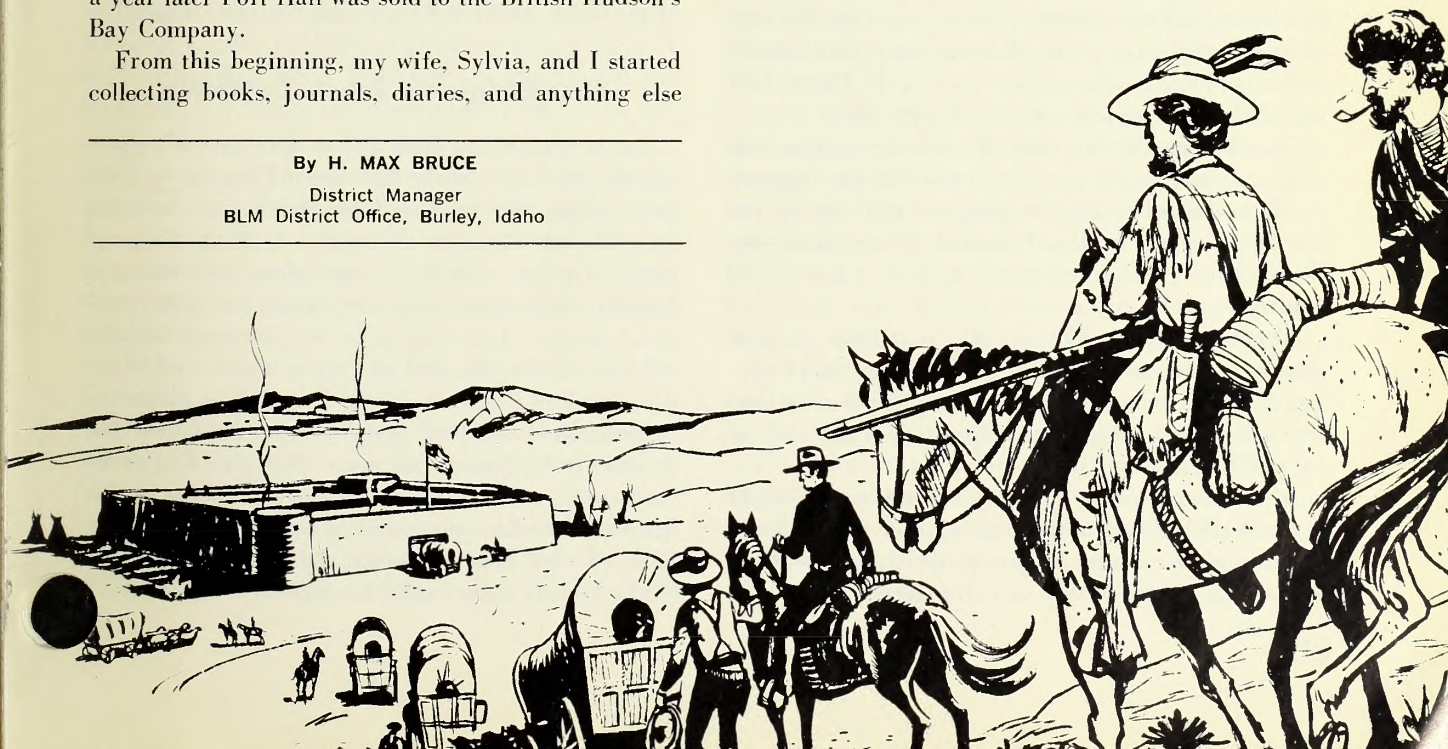
Hunt was in the employ of John Jacob Astor and was racing to beat the Canadians of the Northwest Company to the controlling point at the mouth of the Columbia. Hunt didn't make it in time, but other Astor men

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By H. MAX BRUCE

District Manager  
BLM District Office, Burley, Idaho

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who went by ship did. Hunt made the mistake of traveling on the treacherous Snake by dugout canoe. A boat catapulted onto the rocks below what is now Milner Reservoir and a steersman, Antoine Clappine, was killed.

Thus, it was the fur trappers who initially searched out the routes and blazed the trails that the emigrants would follow later. The routes funnelled between the Salt Lake Desert on the south and the Snake River on the north, and they funnelled through Cassia County which is located squarely between these two barriers.

## Overland to California

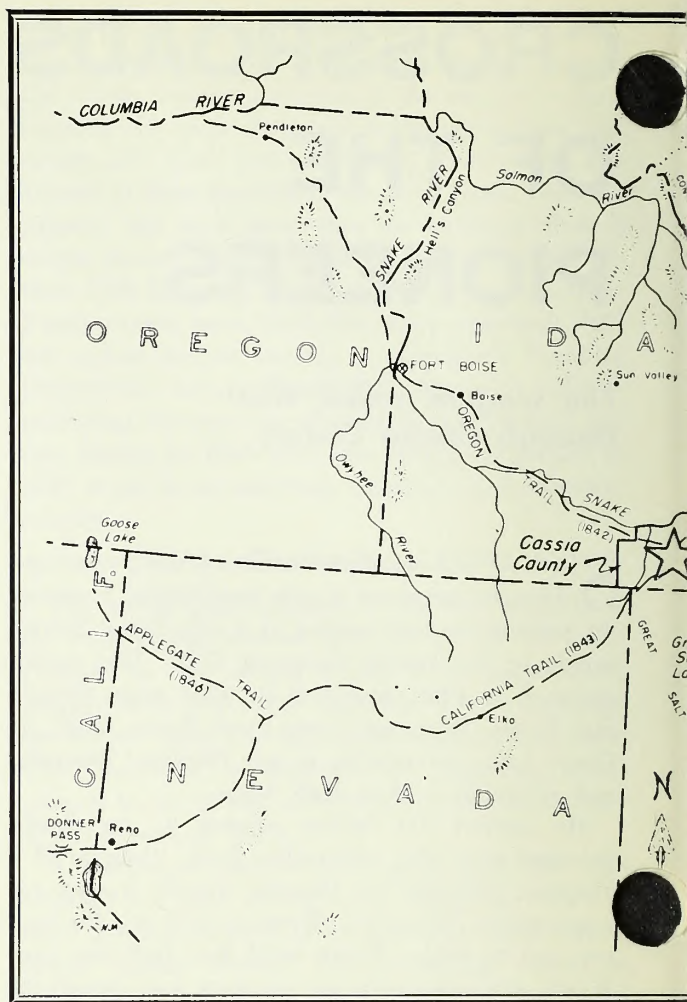
In 1840, a young Missouri school teacher, John Bidwell, talked with a Frenchman, Antoine Roubideaux, about the virtues of a faraway land called California. Antoine and his brother, Joseph, were in the trading business and established trading posts in Taos, N. Mex.; Uintah County, Utah; and a city which Joseph founded, St. Joseph, Mo. The more Bidwell talked and questioned and listened, the more interested he became. He resolved to go to California, and to go overland. It had never been done before except by explorers and fur trappers. Bidwell traveled around the countryside to solicit interest and found fully as much as he had hoped for.

On a May day in 1841 the families and individuals who had agreed to attempt the journey met at "Sapling Grove, Mo., the place of rendezvous." The party consisted of 69 men, women, and children. A man named Bartleson was elected captain and all was made ready. Then someone asked, "Which way do we go?" Not one person knew the way to California. Someone had heard, however, that a company of Catholic missionaries was going to the Flathead Nation of Indians with an old Rocky Mountaineer for a guide. They would wait for this company and travel with them.

Tom Fitzpatrick was the mountaineer, and he was indeed a veteran. He was one of the best fur trappers in the business and his knowledge of the country, the weather, and the Indians from the settlements to the Pacific Ocean could be equaled only by a handful of fellow trappers.

Although Fitzpatrick left the emigrants at Soda Springs, Idaho, and turned north to the Flathead Country, it was his leadership that had got them that far and his counsel and advice that helped them eventually to get to California.

After leaving Soda Springs, Bidwell led his party down the Bear River to the north edge of the Salt Lake Desert and then across country to the Humboldt River in Nevada. His route was an unfortunate choice for it



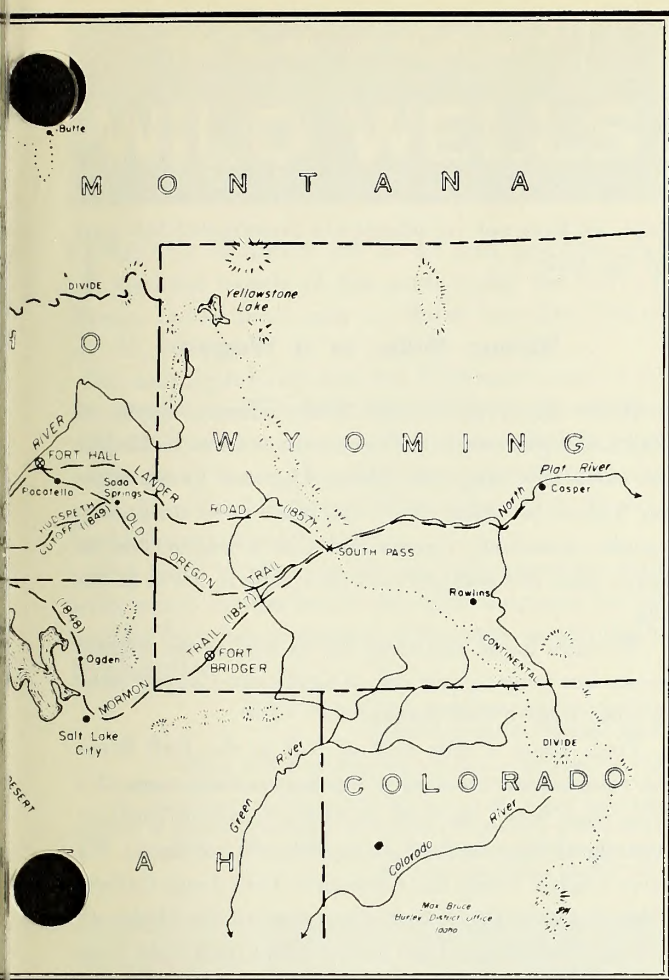
proved hazardous and impractical for wagons because of the harsh desert and the rough, broken country.

## First Emigrants Reach California

But in spite of hardship and danger Bidwell's party became the first to make the overland journey to California when they reached John Marsh's ranch on the San Joaquin River on November 4, 1841. They arrived, however, with little more than their shirts, a condition that was not unusual among the earlier emigrant parties. Traveling unknown distances through unknown lands, they had long since been forced to eat their stock and abandon their wagons and goods.

Although the Bidwell party pioneered the overland journey to California, the route they took was never used again; a better way was found in 1843 by Joseph Reddeford Walker, a veteran of some 13 years in the West (Walker Lake in Nevada and Walker Pass in the Sierra Nevada were named for him).





Fitzpatrick was again the guide for part of the way. For a proposed fee of 500 government dollars he agreed to lead the train from Fort Laramie to Fort Hall.

Fitzpatrick, however, had a little difficulty collecting his fee. Apparently White did not have the authority to pay Fitzpatrick by requisitioning government dollars. To settle the debt, Fitzpatrick finally was hired as an interpreter and put on the payroll of the sub-agency for the Indians west of the Rocky Mountains. He collected \$503.35 for the period, January 1843–September 1844. No one objected that most of this time he was with John C. Fremont's Second Expedition to Oregon and California, or that he collected \$1,750 as Fremont's guide.

### First Emigrants Reach Oregon

The White party abandoned their wagons at Fort Hall in order to speed their journey to Oregon. White and a few men who were well-mounted and anxious for journey's-end went on ahead of the main party with a Hudson's Bay trader who was returning to Fort Vancouver (the site of present-day Vancouver, Wash.) which was the main western headquarters of the Hudson's Bay Company. They stopped briefly at the Company's Fort Boise at the mouth of the Boise River, and then proceeded west through Burnt River Canyon, the Grande Ronde Valley, and then over the Blue Mountains. They reached the Willamette Valley and Fort Vancouver about the 20th of September, 1842. The main group, not so well-mounted and slowed by women and children, reached the Willamette Valley on the 5th of October. The first emigrants to travel overland to Oregon had arrived—just 11 months after John Bidwell and his party completed the first overland journey to California.

Most of the travelers from the East who followed these pioneers to Oregon and California took the same general route until they reached a point near the mouth of the Raft River in Cassia County. The Oregon Trail continued from there along the south side of the Snake River to the crossing near Glens Ferry, Idaho. The California Trail headed south up the Raft River and then southwest to the Humboldt River in Nevada.

Travelers taking trails from Salt Lake City to both California and Oregon entered Idaho from Utah at the head of the Raft River. The California branch intersected the main California Trail south of the City of Rocks—a scenic attraction acclaimed in emigrant diaries as well as today's travel folders. The Oregon branch went northwesterly through present-day Albion, Idaho, Cassia County's first county seat, and then

Backtracking on a route he had traveled eastward in 1834, Walker did not turn at the bend of the Bear River as Bidwell did but continued westward via Fort Hall to the Raft River in Cassia County. He left the Snake River Valley at this point and traveled south and west to Goose Creek and to the Humboldt River.

This route, north and west of the Salt Lake Desert, provided more water and forage, and the terrain was suitable for wagons. Even Walker, however, failed to find a suitable passageway over the Sierra Nevada, and it was another year before wagons successfully crossed that final barrier.

The first emigrant train to Oregon started under the leadership of Elijah White in May of 1842, the year following the Bidwell Party. The train consisted of 18 large Pennsylvania wagons, a long procession of horses, pack mules and cattle, and 112 persons.

White, a newly commissioned sub-Indian Agent, had been in Oregon before but had traveled there by ship. This was his first attempt at an overland journey. Tom



westerly to intersect the main Oregon Trail near the western boundary of Cassia County.

Another trail was established in 1849 as a short cut to California. This trail, the Hudspeth Cutoff, left the main trail at Soda Springs—at which point the Oregon and California Trails were still identical—and crossed numerous mountains to join the California Trail on the Raft River near Malta, Idaho. The new route avoided the northern swing to Fort Hall, but it was more hazardous and was only slightly shorter.

### Retracing History

From these early beginnings developed the trails that thousands upon thousands would follow until the roadways to the West were worn so deeply that their traces are still visible in many places. Sylvia and I and my four sons spend many of our weekends retracing the remnants of these emigrant trails, especially in Cassia County but also in all of Southern Idaho and north-eastern Nevada. To guide our explorations we have used published and unpublished diaries, old maps (several are available at the Oregon Historical Society in Portland), aerial photographs, and old survey plats in BLM's Land Office in Boise. From the beginning we tried to find our way, insofar as possible, through research rather than by asking. So far we have been satisfied with our successes.

What have we found? Most important, perhaps, we've experienced the excitement of discovery. We've found obvious signs of the trails: ruts 3 feet deep in some places and in others an exuberant growth of sagebrush caused by the droppings of hundreds of animals and the accumulation of moisture in the depressions. And, of course, in areas that have been disturbed by man we have had to speculate as to probable routes.

We have found where the California and Oregon Trails separate about 25 miles east of Burley. California-bound emigrants had the choice of staying below the ledge on the west side of the Raft River or climbing to the top of the ledge and following the ridge parallel to the river. This place is easily identified from the highway between Burley and Pocatello: it is the most prominent rocky point on the west side of the Raft River about 1 mile south of the highway. Signs of three emigrant graves are near this trail junction.

We have learned from diaries and journals that the California Trail crossed the Raft River three times,

once at its junction with the Oregon Trail, again some 4 miles upstream, and a third time about 3 miles south-east of Idahome, Idaho. We have been able to follow good to fair track on the west side of the Raft River all the way to Cassia Creek, but traces on the east side for 11 or so miles have been largely obliterated; however, we have not yet intensively investigated this part of the trail.

### Sixteen Mules to a Wagon

Where the trail left the Snake River bottoms at Fall Creek just east of the Cassia County line it climbed an extremely steep hill. Major Osborne Cross wrote on August 10, 1849: ". . . the hill was so steep as to require sometimes sixteen mules to a wagon, and as many men as could get hold of a rope to get it to the top . . . ."

We have found this steep hill as well as the slightly easier but longer grade out of Coldwater Canyon some 2 miles west of Fall Creek.

From about a mile west of Naf to the Raft River narrows we have walked along the excellent trace of a trail from Salt Lake City and have found its junction with the California Trail south of the City of Rocks. We have walked along the California Trail from Granite Pass to Goose Creek, and over parts of the Hudspeth Cutoff. The Oregon Trail has excellent track west from the Raft River until it disappears into cultivated fields.

Intermittent traces can be found across dry farms and irrigated pastures to Marsh Creek some 10 miles east of Burley. The trail is then lost in cultivated fields but can again be found about 5 miles west of Burley on the south side of Milner Reservoir on the Snake River. Here we find about 5 miles of the trail which we think will become the pride of Cassia County. The present condition of this trace is unsurpassed.

Our investigations so far have indicated that emigrant routes through Cassia County covered some 230 miles. Alternate routes like the ones above and below the Raft River ledge add another 15 miles or so. But more important to my family as well as to all people who like to explore the past, at least half of these historic miles still show traces of the days when Cassia County was a crossroads of the pioneers. □



## The battle of Platform C

# WILD WELLS

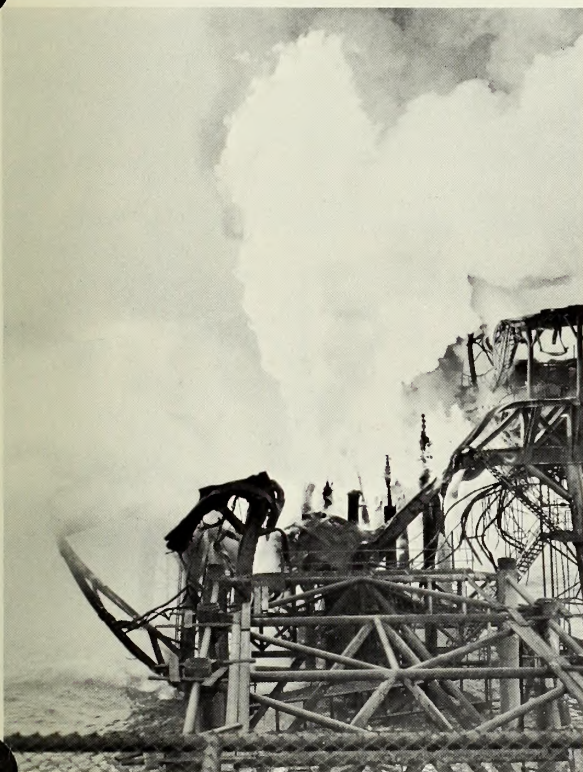
**T**ORRID FLAMES fed by oil and gas from the belching bowels of the earth under the Gulf of Mexico roared forth early on Mardi Gras day, February 10, 1970.

The roaring inferno engulfed Platform C, one of 22 similar structures in Main Pass Block 41, an offshore oil field 75 miles southeast of New Orleans and 23 miles northeast of Venice. Venice is the last outpost on the road down the Mississippi River delta; Main Pass is one of the mouths of the river.

The battle to blast out the fire and control the wild wells was to test the best in men and equipment for the next 50 days before the last of the wells would finally be controlled.

Below: Huge beams and steel pipes twisted like spaghetti under the intense heat.

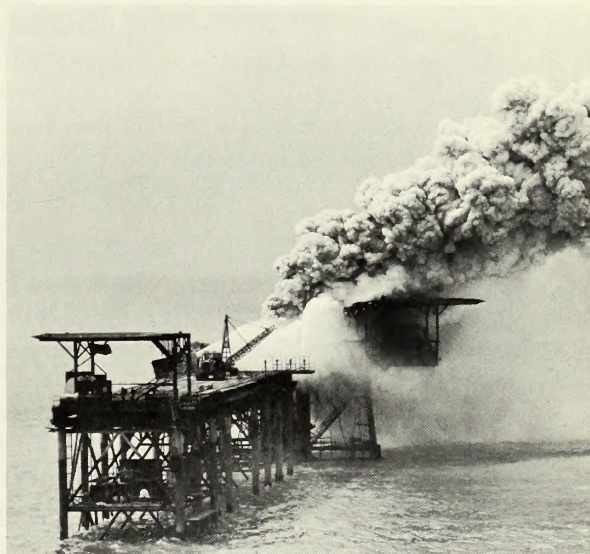
Right: With a red flag flying to signal radio silence, the tractor operator moves the explosive into position above the burning wells. The barrel on the end of the boom held 300 pounds of dynamite wrapped in asbestos to prevent a premature explosion. Moments later the dynamite was detonated and the fierce blaze was snuffed out.



Extinguishing the flames and capping the wells became the assignment of Boots Hansen and his crew from the Red Adair Company, a Houston, Tex., firm that specializes in the control of wild wells.

The first step was to build a work platform adjacent to the blazing C structure which had been turned into masses of twisted steel surrounding the platform's cluster of 12 wellheads. Initially, three of the wells (which currently were producing) had burst into flame, but several more ignited as valves were melted by the intense heat. The inferno was fed by oil and gas pushing out of the earth at a pressure of 1,500 pounds per square inch.

Each well on a platform is topped by a "Christmas tree," a roughly triangular arrangement of valves, cranks, and couplings about 6 or 8 feet high. Also a part of the platform structure are a landing pad for helicopters, a catwalk where boats can dock, stairways from near the water to the upper part of the structure, generators, pumps, compressors, pressure vessels, pipes, couplings, gauges, and safety devices—all to control the flow of oil and gas from the wells via underwater pipelines to the shore.



Oil well platforms are supported by four tubular legs which are braced and outspread for stability against waves and storms. The structures extend 40 feet or more above the surface of the gulf which varies from 30 to 60 feet deep in Block 41.

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By **ROBERT D. HOSTETTER**

Assistant to the State Director  
BLM State Office, Portland, Oregon

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## Work Platform Built

Platform C was built 40 feet above the water to escape hurricane-driven waves, and the fire control work platform had to be of comparable height. Since the Gulf of Mexico is 40 feet deep there, the total height of the structure had to be 80 feet. Two eight-legged steel jackets, each weighing 120 tons, were placed next to the C structure. Then pre-fabricated deck sections—floored with 150 foot-square Douglas-fir beams 40 feet long, and covered with 3-inch hardwood planks—were swung into place. With helicopter landing pad surmounting it, the 500-ton work platform when completed was 40 feet wide and 240-feet long.

Meanwhile, seven barges equipped with skimmers to suck spilled oil from the water surface were anchored to form a quarter-circle on the shoreward side of the wells. Between them were floating booms to help corral drifting oil. A second line of defense consisted of six oil-chase skimmer boats and a barge towed sideways by two tugs, all equipped with floating suction devices to pickup oil.

On March 9, Boots Hansen and his men packed 300 pounds of 80-percent dynamite into a steel barrel through a square door cut in its side. An igniter was placed in the middle, with wires running to the rear of the platform, and the barrel was wrapped with several layers of asbestos. To position the barrel over the blaze, it had been welded to a 107-foot steel boom on a crawler dolly hooked to the rear of a tractor. A cable on the tractor's winch raised and lowered the boom.

Radio silence was imposed before the dynamite packing began to avoid premature discharge. The *George R. Brown* derrick barge, whose crew constructed the work platform, moved 1,000 feet away. All boats and aircraft moved back to safe distances.

Boots directed the tractor operator as he backed the boom to a point predetermined by a dry run that placed the barrel of dynamite 20 feet above the roaring wells. The five Red Adair men scurried to the protection of a 5/8-inch steel shield at the opposite end of the platform. An electric contact fired the dynamite, and the thunderous blast snuffed out the fire like a candle.

Quickly the men directed six water nozzles, throwing 4,000 gallons a minute, to cool off the superheated steel. But that wasn't enough! After only 6 minutes the blaze reignited with a roar.

## Second Try

Next day, March 10, two more nozzles were added on the work platform, and the spray barge, *Jirafa*, stood close by, ready to cool things down.

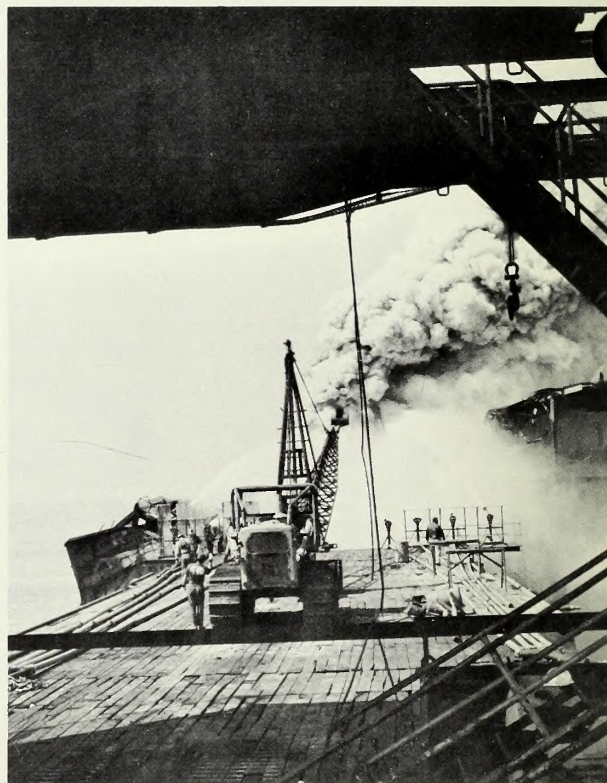
The tension was even greater than the day before as radio silence was ordered, a new dynamite barrel was packed, and the tractor was backed into place with a wall of water shielding away the heat.

The explosion! Great streams of water cooled the steel, and the smoke cloud drifted away. Success in phase one!

Oil spewed 50 feet into the air above the structure, then fell to the water and drifted toward the waiting barges.

The fire was snuffed out at 11:27 a.m.; then the C structure was doused with water for 3 hours to guard against reignition before the *George R. Brown* derrick barge was moved alongside the work platform. With its huge crane pointing skyward as high as a 15-story building, it swung a prefabricated steel scaffolding into position around the well heads, resting it on the still level boat decks of the otherwise distorted C structure. A prefabricated catwalk was swung into place, and at 5 p.m. Boots Hansen was the first to walk the 35 feet from the work platform to the scaffolding on the C structure to inspect the spewing wells at close hand. Next day would commence the job of controlling each well.

Wind, rain, and heavy seas accompanied operations,



Boots Hansen directs George Curry as he backs the tractor to position the dynamite barrel 20 feet above the burning wells



but during the next 2 days steel grating was placed around the well heads to form a walkway. Canvasses were wrapped around wells 8 and 10 to keep oil from spraying, and a 5-gallon bucket held in place with baling wire over a valve on well 1 changed its spray to a dribble. Ten-foot lengths of corrugated culvert pipe, 4 feet in diameter, were lowered over wells 1, 2, and 9.

## Relief Wells Drilled

Meanwhile, three oil well drilling rigs were floated into place so that relief wells could be drilled to the bottom ends of wells 6, 9, and 11. The plan was to cut them off by pumping mud down the relief wells and through the sand between the lower ends of the relief and wild wells, and thereby plugging the wild wells from below. The rigs drilling the relief wells were stationed more than a quarter of a mile from the oil well heads on structure C, but with directional drilling, the relief wells bottomed out near the bottoms of the wild wells. Well 9 was plugged on March 13 and well 11 sanded shut of its own accord. A relief well was started to well 2, and attempts to plug well 6 from below continued.

Wells 3, 4, 5, 7, and 12 were dead from the start, so

that left four flowing wells—1, 2, 8, and 10—for the Red Adair crew to cap from above. To do so required blasting off the damaged Christmas trees and installing new ones.

Boots Hansen tackled well 10 first, on March 13. Two shaped charges of the explosive, RDX, each 18 inches long, weighing 5 pounds, and encased in a waterproof metal container, were bolted on opposite sides of the well superstructure. To avoid igniting the oil and gas still blowing from the wild wells, a pipe made of  $\frac{7}{8}$ -inch steel, 4 feet in diameter and 10 feet long, was lowered over the tree to be cut off. Dry fire extinguisher chemical wrapped in plastic was packed around the explosive. Eight  $1\frac{1}{2}$ -inch pipes welded through the sides of the pipe poured water throughout the interior. Corrugated culvert pipes 4 feet in diameter and 10 feet tall encased other flowing wells to reduce the possibility of reignition.

There was a puff of black smoke and a sharp report as the shaped charges were fired. The other wells did not reignite! Success again! The RDX explosive is shaped so that the force of its blast which lasts only four-millionths of a second, is directed to a very thin plane. When the tree was hoisted away, the cut appeared as though it had been made with a welder's torch.

Removing the tree allowed oil and gas to go straight up until a new valve assembly could be superimposed over the well and a new flange used to clamp it to the well head tubing hanger. Then the valves were closed and the oil flow halted.

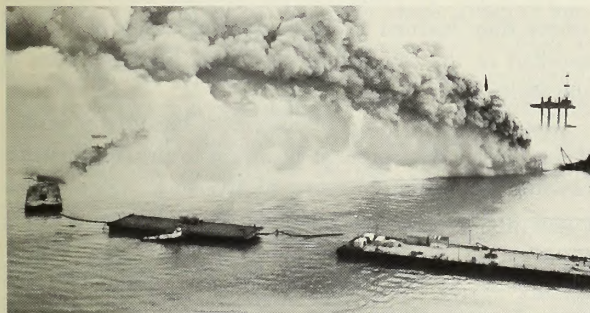
The same procedure was used to cap well 1 the next day, well 8 on March 19, and well 2 on March 22. With well 2 successfully capped from above, the drilling of a relief well to plug it from below was discontinued. Now all the flowing wells except well 6 had been plugged or capped, and the *Mr. Arthur* drilling rig would soon finish number six.

*Mr. Arthur* had drilled a relief well to a point near the bottom of well 6. Its powerful pumps had then forced a quarter of a million gallons of water down the relief well at the rate of 33 barrels a minute to cut a channel through the sand to the bottom of well 6.

A 5 o'clock on the morning on March 31, with the channel completed, *Mr. Arthur's* pumps switched from sea water to oil well mud. A batch of 5,500 barrels of mud had been mixed, but before it was all used well 6 started spurting mud from its top. Soon the spurting slowed and then bubbled to a halt. Well 6 was plugged after blowing wild for 50 days, and at last on Platform C the battle was stilled. □

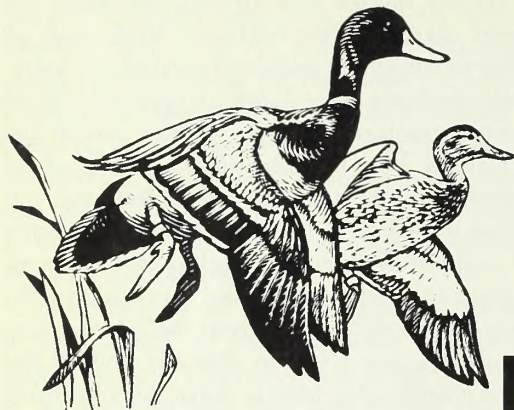


Oil spumed 50 feet above the platform after the fire was blasted out. The *Jirafa* spray barge moved in to help pour water on the jetting oil and gas to prevent reignition.



Seven barges, connected with floating booms, formed a quarter-circle on the shoreward side of the burning wells to prevent drifting oil.





# MONTANA'S DUCK FACTORIES

**D**URING the past 20 years, North America's prime waterfowl nesting areas have suffered great losses from drainage, industrial development and intensified agriculture. This is true of the prairie pothole country, a vast region of glacier gouged ponds that covers parts of Alberta, Manitoba, Saskatchewan, North Dakota, Minnesota and last, but in view of recent development, certainly not least—Montana.

This region is but 10 percent of the continent's total duck production area, but it produces more than half of North America's ducks. Up to 80 percent of all mallards and pintails are produced in the pothole country in addition to great numbers of blue-winged teal, baldpate, and gadwall. These "puddle" ducks prefer the small water habitat characteristic of the prairies in contrast to "divers" such as redheads and canvasback which normally nest in larger marshes of wetlands.

Much of the loss of critical waterfowl breeding and nesting habitat has been offset through construction of stock ponds, particularly in eastern Montana. Nearly 8,000 of these ponds have been developed by the Bureau of Land Management in eastern Montana, and these attract breeding pairs of mallards, pintails, teal, gadwalls, and baldpates, the blue-ribbon ducks of the Central Flyway. An untold number of ponds have also

been constructed on private and state lands in the same area. In addition, this prairie region contains a large number of potholes of glacial depressions which fill during wet years and provide additional "bonus" habitat.

## Attractive Habitat

The pond construction program has taken on even greater dimensions within the past 10 years. Canada geese now nest on stock ponds as small as two surface acres if suitable nest sites are available. This local breeding population of geese has established itself naturally as a result of this attractive "new" habitat. With such a natural breeding base, an expansion of this population to other pond areas with suitable nesting habitat is inevitable. The Canada "honker" is known to have a strong homing instinct. The ability of nesting females in particular to return to the specific sites or ponds where they learned to fly as goslings appears to have resulted in the establishment of this breeding base in the Malta BLM district.

The Bureau of Land Management has now modified the reservoir development program to provide benefits beyond the initial purpose of livestock water. Stock ponds are an excellent example of modifying a going program to provide additional benefits for wildlife. Frequently, if the modifications are initiated at the time of construction, they can be done with little or no additional cost. Guidelines for certain modifications have been developed through a joint effort by personnel

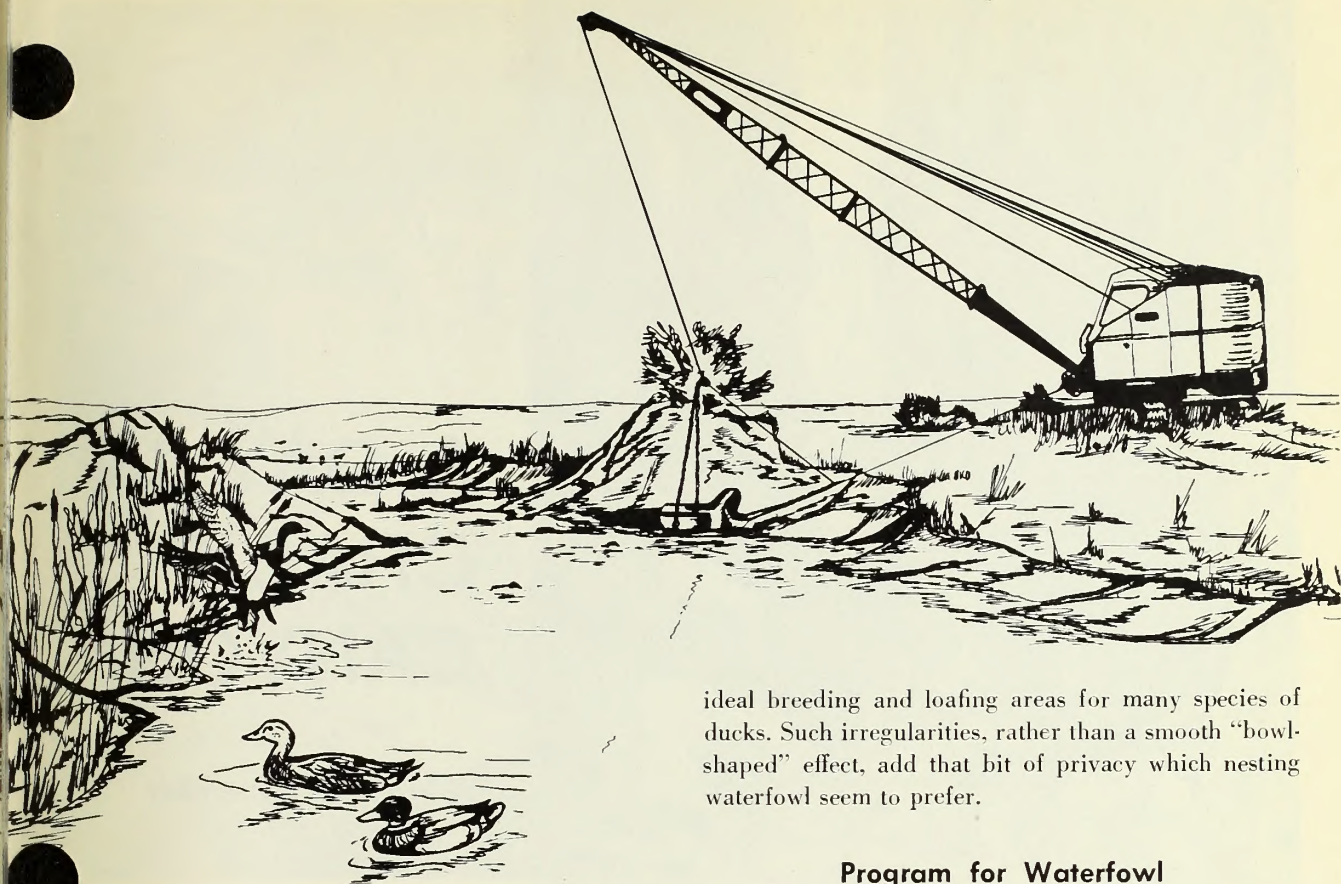
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By JACK D. JONES

Wildlife Management Biologist  
BLM District Office, Malta, Montana

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ideal breeding and loafing areas for many species of ducks. Such irregularities, rather than a smooth "bowl-shaped" effect, add that bit of privacy which nesting waterfowl seem to prefer.

### Program for Waterfowl

from Montana State University, the Montana Fish and Game Department, and BLM wildlife specialists and engineers. Emphasis is presently being placed on guidelines involving island construction and shoreline manipulation.

Small islands are frequently planned into the actual construction phase. The value of islands to nesting geese and various species of ducks, such as gadwalls, scaup, and teal, is well known. Island habitat provides greater security for nesting waterfowl and will enhance brood survival to the flight stage. Nesting success for geese on islands has been reported as high as 90 percent compared to 20 percent on the mainland. Island construction is possible by cutting off peninsulas, throwing up dirt mounds on delta areas, and isolating natural knolls or humps during the construction operation.

Opportunities also exist for island construction on existing ponds under the regular reservoir maintenance program. Islands are easily thrown up during periods of low water levels with earth-moving equipment or with a dragline. Other modifications include leaving regular shorelines and short peninsulas to produce

Future pond construction on public lands will be justified more on the basis of multiple-use benefits than on single purpose. The Bureau of Land Management constructs nearly 240 ponds per year in the eastern two-thirds of Montana, so we can be optimistic about the future of this program for waterfowl. The value of low-level dams for waterfowl production has already prompted Ducks Unlimited (Canada) to construct many ponds annually.

BLM is also supporting a research study with Montana State University to determine the relationship between rest-rotation grazing management and waterfowl production. This study, covering two grazing allotments in the Malta district, may show the way to even greater rangeland benefits for waterfowl. Nesting cover adjacent to ponds is important to ducks and geese and is worthy of special attention in BLM's new livestock grazing systems.

Habitat losses will continue to be paramount in the minds of persons having a deep interest in the well-being of migratory waterfowl. Likewise, creating and maintaining suitable habitat for these birds will be a key responsibility of BLM resource people managing the public lands of Montana and the Dakotas. □





The crack.



A world of rock.

# A DAY IN CRACK CANYON

*A walk to remember*

**T**HE MARCH morning was crisp when we left our car beneath a cottonwood tree near Wild Horse Spring, about 20 miles north of Hanksville in east-central Utah. Ahead, the jagged outline of San Rafael Reef was etched against the sky, and the scudding clouds gave only an occasional glimpse of the blue.

Shouldering my pack, I jumped across the damp wash bottom and listened with pleasure to the excited comments of my 14-year-old son, Steve. We and my wife, Beverly, were on our way to see an incredibly narrow canyon which cuts through the sandstone formations of the reef and, during summer thunderstorms, pours large quantities of water into Wild Horse Wash.

We plodded through pink-colored sand dunes to the broad mouth of Crack Canyon and followed the mean-

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By **JOHN D. CARLSON**

Area Manager  
BLM District Office, Price, Utah

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Bev and Steve halfway up the side of the San Rafael Reef.

dering course of the wash upward through ever-heightening cliffs on either side. The pinks, browns and tans of the rocks offered spectacular backdrops for the greens of the pinon and juniper trees. Our winter-dulled senses were delighted at the array of color which greeted us at each bend in the canyon floor.

We were walking through eons of geologic time with each successive change in rock formation and each formation offered its own special qualities of color, texture, and shape.

The sun appeared more frequently as the day wore on, and we were soon ready to open our jackets or stuff them into my already overcrowded backpack. Steve's questions and comments were a never-ending stream as we traveled through the spectacular landscape with some awe and considerable enthusiasm.

Noon found us among rounded, dome-like formations of Navajo sandstone, and on the sunny side of the canyon in a spot sheltered from the cool breeze we made a small cooking fire. Before long we were dining on pork and beans, potato salad, and sizzling ground beef patties.

Pushing on after lunch, we found the canyon beginning to narrow. Soil and vegetation soon disappeared from the narrow floor and we were left in a world of rock. The canyon walls rose still higher until they towered several hundred feet. Suddenly it appeared that we had come to a dead end, a large box canyon with no apparent way out.

Steve was elated with the adventure of the moment. Laughing, he headed up the wash running, determined to be the one to find the route the flood water must take to smash its way into the canyon. His shout echoed through the canyon as he reached the towering wall at the far end.

"Here it is! Man, what a gash!"

Bev and I broke into a run and when we reached the high wall, there it was. The canyon took a 90° turn to the left and became so narrow—no more than a crack in the San Rafael Reef—that I could almost span its width with my arms.

There in the deep, narrow crack it was dark, cool, and very still. Even Steve was quiet for the moment, and almost as if we were in a great cathedral we walked the 200 yards through the crack. We turned around at the far end and looked back into the crack, acknowledging the ages and forces that had formed it, and then we were off again, anxious to see what was around the next bend.

We walked still further that day, finding fresh vistas and new adventure wherever we went among the deep canyons and high cliffs of the San Rafael Reef. And at sundown, still another thrill: a cougar bounding along before us.

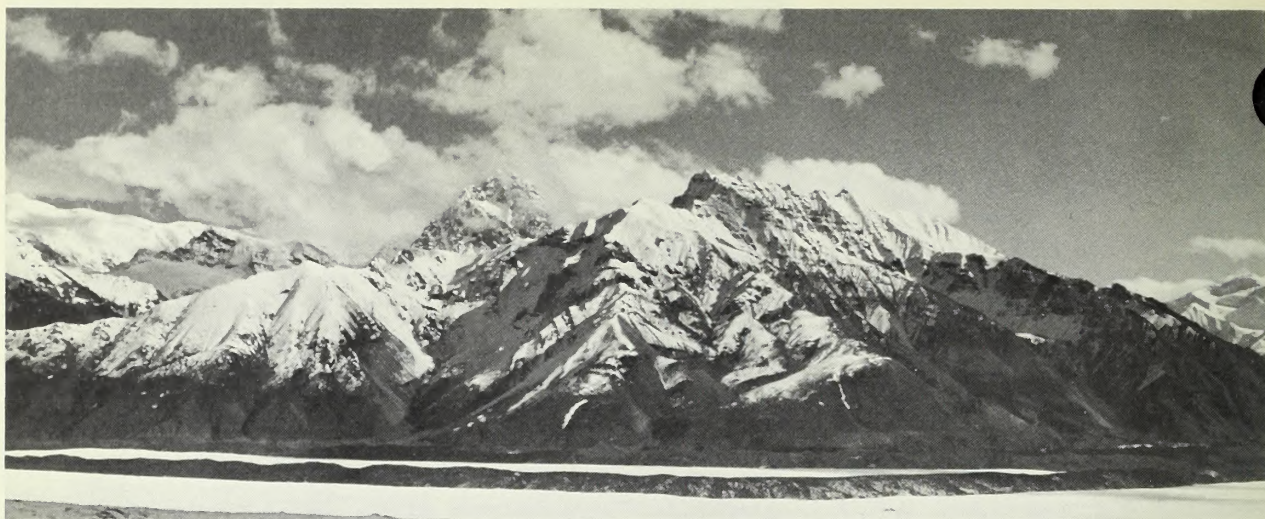
We were all tired by the time we reached the car, for we had walked about 12 miles. It had been a real adventure.

Driving home, I thought about the events of the day. I wondered just what there was about the trip that had impressed me so. There was the spectacular crack in the San Rafael Reef. There was the magnificent reef itself. But it was more than these things.

Suddenly I knew. Since leaving the car that morning we had seen no sign of the presence of man on the face of the earth. We had been a small island of humanity absorbed into a totally natural environment. Not so much as a beer can, an ax mark on a tree, or the track of a cow had been there to remind us of the 20th century. For a moment in our lives we had broken the time barrier.

I glanced at my son sleeping beside me, and I wondered: Would Steve ever again have the chance to live one whole day of his life outside the confines of our exploding society? ☐





**Scenic Area in Alaska Proposed.**—Secretary of the Interior Walter J. Hickel has proposed the creation of the Wrangell Mountains National Scenic Area in southcentral Alaska. The proposal involves 10.5 million acres of some of the highest and most spectacular terrain in North America. The scenic area, planned as a new concept in Federal land management, would be managed by BLM on a multiple-use basis, but first considerations would be given to outdoor recreation and the preservation of the wild scenic environment.



This is a compilation of the most up-to-date information possible on up-coming sales of public lands by land offices of the Bureau of Land Management. For details of land descriptions, prices, and other information pertinent to sales, you must write the individual land office concerned. In most cases, there are adjoining land-owners who have statutory preference rights and may wish to exercise them to buy the land. Sales notices will point out, insofar as possible, problems relating to (1) access, (2) adjoining owner preference rights, (3) small-tract sales limitation of one per customer, and other pertinent information. When possible, all sales are scheduled far enough in advance so ample notice can be given in Our Public Lands. Sales listed can be canceled on short notice for administrative and technical reasons. A listing of BLM land offices with addresses is found on the opposite page.

## ALASKA

Public lands in Alaska are not available for sale at this time. Future public land sales will be announced in this space when scheduled.

**Key:** A, acres; app, appraised; El, elevation; est val, estimated value; Cty, county; veg, vegetative; pot, potential; pub, publication cost; elec, electricity; tel, telephone; D.O., District Office; L.O., Land Office.

## ARIZONA

76.59 A, 10 miles south of Safford, Graham Cty. Extremely rough and mountainous grazing land; no legal access; no improvements. El 3,600 feet. App \$25 per A.

40 A, 10 miles south of Safford, Graham Cty. Rolling and hilly, suitable for livestock grazing. No legal access; no improvements. El 3,500 feet. App \$55 per A.

60 A, 8 miles south of Safford, Graham Cty. Rolling to hilly, cut by washes. Good access; utilities available. El 3,260 feet. No improvements. Future spot for rural residential development. App \$160 per A.

## CALIFORNIA

111 tracts in 6 different areas of the high desert country in San Bernardino Cty. Available at auction each Wednesday, 10 a.m., Riverside District and Land Office. Tracts not sold are bound over for next auction.

## MONTANA

4 tracts: 70 A, 27.77 A, and 2 tracts 10 A each, 16 miles west of White Sulphur Springs, Meagher Cty. Isolated; hilly and undulating grazing land in



lower foothills of Big Belt Mountains. Soils are medium textured and shallow to moderately deep clay loam. Water on 1 tract only. Access by 2 miles of primitive road over private land. App \$275 to \$1,320 plus pub.

80 A, 39 miles southwest of Malta, Phillips Cty. Level with silty loam soil on top of heavy clay. Native short grasses; no stockwater; no legal access. App \$2,000 plus pub.

77.47 A, 13 miles east of Miles City, Custer Cty. Moderately rolling to steep grassland range with scattered ponderosa pine. Sandy to silty loams, very shallow. No stockwater; no legal access. App \$1,080 plus pub.

40 A, 17 air miles south of Poplar, McCone Cty. Gently sloping to broken; well-defined coulee traverses tract. Grassland with brush in coulee. Silty to sandy soils. No stockwater; no legal access. App \$800 plus pub.

2 tracts, 40 A each, 55 air miles southeast of Miles City, Custer Cty. Rolling grazing land; no stockwater. Access via private ranch trails. App \$760 each plus pub.

#### NEVADA

640 A, 13 miles south of Mill City, Pershing Cty. Nearly flat with sandy silt loam soils; greasewood and shadscale veg. El 4,300 feet. No zoning; no utilities; no legal access. Physical access by jeep trail. Est val \$2,800. Sale at Reno L.O., 2 p.m., August 5, 1970.

80 A in 2 separate 40 A tracts, 35 miles south of Ely, White Pine Cty. Rolling, hummocky terrain with gravelly silt loam soils. Sagebrush, greasewood and shadscale veg. El 5,300. No utilities. Legal access by short stretch of dirt road from paved highway. Est val \$1,040. Sale at Reno L.O., 2:15 p.m., August 5, 1970.

#### NEW MEXICO

3 tracts, 40 A each, 50 miles east of Albuquerque, 40 miles south of Santa Fe and 5 to 9 miles east of Stanley at State Highway 41. Terrain ranges between flat native grassland to rolling pinon-juniper woodland. El 6,400 to 6,700 feet. No legal access; good physical access via private ranch roads. Elec and tel at ranch headquarters 1/2 to 4 miles from tracts. App \$1,400 each.

#### UTAH

80 A, 3 miles northeast of Fillmore, Millard Cty. Isolated. Rough and moderately steep grazing land. No water; no improvements. Access from Fillmore by improved road. App \$1,200.

3 tracts: 2 tracts 40 A each app \$1,600 each and 1 tract 202.94 app \$8,120, 10 miles northwest of Mt. Carmel Junction, Kane Cty. Steep, mountainous grazing lands. No water; no improvements; no legal access.

80 A, 18 miles southeast of Monticello, San Juan Cty. Steep and rocky grazing land. No water; no improvements. Access road to southeast corner of tract. App \$1,200.

#### WYOMING

63.95 A, 50 miles southwest of Green River, Sweetwater Cty. Rolling to rough and broken. Legal access via State Highway 530 and Sweetwater Cty Road 4-1. Sale after August 1.

280 A in 2 tracts, 16 to 17 miles northwest of Pine-dale, Sublette Cty. Tract 1 is rolling sagebrush land with legal access via a Cty road off Highway 187. Tract 2 is primarily rolling sagebrush land with a marshy area containing a flowing spring; no legal access. Sale after August 1.

44.66 A, 4 miles west of Buffalo, Johnson Cty. Tract is surrounded by private lands; no legal access. Strongly rolling grassland. Sale after August 1.

40 A, 6 miles northwest of Sheridan, Sheridan Cty. Moderately to steeply rolling rangeland, Surrounded by private land; no legal access. Sale after August 1.

#### Bureau of Land Management Land Offices

##### ALASKA:

555 Cordova St.  
Anchorage, Alaska 99501  
516 Second Ave.  
Fairbanks, Alaska 99701

##### ARIZONA:

Federal Bldg., Room 204  
Phoenix, Ariz. 85025

##### CALIFORNIA:

Federal Bldg., Room 4017  
Sacramento, Calif. 95814  
1414 Eighth St.  
Riverside, Calif. 92502

##### COLORADO:

14027 Federal Bldg.  
Denver, Colo. 80202

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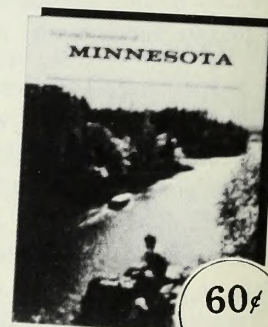
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